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TO: Docket Management
FROM: Virginia Tech Transportation Institute
RE: Docket Number NHTSA-02-13546; Notice 1
DATE: February 14, 2003

In response to NHTSA's request for comments regarding Event Data Recorders (EDRs), the Safety and Human Factors Engineering Group of the Virginia Tech Transportation Institute (VTTI) would like to submit the following in response the "safety issues" questions. VTTI has limited direct experience with the other issues provided.

A. SAFETY ISSUES

(1)   <u>**Safety potential.**</u> **The NHTSA EDR Working Group concluded in its August 2001 final report (section 11.1) that EDRs have the potential to improve highway safety greatly. Do you agree with this finding? What do you see as the most significant safety potential of EDRs?**

    EDR data could potentially provide a considerable safety benefit. Information such as seat belt use, air bag deployment stages, vehicle speed, and vehicle accelerations are a few of the data elements that could lead to improvements in vehicle design for crashworthiness and crash avoidance. EDR data coupled with post-crash analysis may provide considerable road design information. Also, EDR systems designed to activate an Automatic Collision Notification system and connect to emergency assistance is another potential safety feature.

    However, EDRs will not be a panacea to allow researchers to address all driving issues. Many pre-crash actions of the driver can not be specified with an EDR, nor can all interactions with other vehicles, pedestrians, animals, or other obstacles. The safety potential of EDRs can be quantified once the possible data elements that can be recorded are specified through research and collaboration with stakeholders.

(2)   <u>**Application.**</u> **EDR technology has potential safety applications for all classes of motor vehicles. Do you believe different types of EDRs should be used for different vehicle types, such as light duty vehicles, heavy trucks, intercity motor coaches, city transit buses and school buses? If so, why? Do you believe different types of EDRs should be used for different applications, such as private vehicles and commercial vehicles? If so, why? If not, why not?**

    Common data elements on all vehicle types will facilitate the most comprehensive post-crash analysis; nonetheless, it is plausible that not all data elements apply to all vehicle types or that additional data elements may be valuable for another vehicle type. Determining the data elements that should be recorded for each vehicle type should be determined through empirical study.

(3)   <u>**Use of EDR data.**</u> **NHTSA has used EDR date primarily to improve its**

investigations and analyses of crashes. In some cases, EDR data includes information that the agency could not otherwise obtain; e.g., which stage(s) of a multi-stage air bag deployed in a crash and when. In other cases, EDR data provide a more accurate indication of matters, e.g., level of crash severity, that have previously been estimated based on crash reconstruction programs. NHTSA includes the new or improved information from EDRs in its crash databases as appropriate. We request comments concerning how other parties, including government agencies, vehicle manufacturers, insurance companies, and researchers, are using these data. We also request comments concerning other potential uses of these data, by NHTSA and/or other parties, which are related to improving vehicle safety, either in the short term or long term.

In and of itself, EDR data provide limited, but valuable insight into the Human Factors issues associated with vehicle crashes. Issues of driver fatigue, distraction, inattention, vehicle interactions, and, for many instances, determining appropriate driver response cannot be determined solely by examining EDR data. Therefore, while EDRs show a great safety potential, its benefit will be limited to specific applications.

(4) **Future safety benefits**. **What additional safety benefits are likely from continued development, installation, collection, storage, and use of EDRs?**

Aside from the myriad of benefits listed in other responses to this docket, VTTI does not know of additional safety benefits of EDRs. In general, improvements in pre-crash data will lead to more informed development of crash countermeasures of all types.

(5) **Research databases**. **NHTSA acquires EDR data in its Special Crash Investigations (SCI), National Automotive Sampling System Crashworthiness Data System (NASS-CDS), and Crash Injury Research and Engineering Network (CIREN) and incorporates them in its motor vehicle research databases. Have you ever used the EDR data stored in these databases? How could the presentation and/or use of EDR data be improved?**

We have only used these data on a limited basis to date. However, we plan to use them more extensively in the future.

(6) **Prevention of crashes**. **Several researchers have documented that the use of EDRs could have the potential to prevent crashes. Some studies of European fleets found that driver and employee awareness of an on-board EDR reduced the number of crashes by 20 to 30 percent, lowered the severity of such crashes, and decreased the associated costs. (See section 2.5.1.1 of the August 2001 NHTSA EDR Working Group final report.) Theses studies have generally been based on small samples and concentrated on commercial application of EDRs. We request comments on other studies of this type and this potential benefit from EDRs, particularly for the U.S. driving population.**

VTTI has conducted two large instrumented truck-driving studies. The references for these studies are:

Dingus, T. A., Neale, V. L., Garness, S. A., Hanowski, R. J., Keisler, A. S., Lee, S. E., Perez, M. A., Robinson, G. S., Belz, S. M., Casali, J. G., Pace-Schott, E. F., Stickgold, R. A., Hobson, J. A. (2001). *Impact of sleeper berth usage on driver fatigue: Final project report* (PB2002-107930). Springfield, VA: NTIS.

Hanowski, R. J., Wierwille, W. W., Garness, S. A., and Dingus, T. A., (2000). *Impact of local short haul operations on driver fatigue: Final report* (DOT-MC-00-203). Springfield, VA: NTIS.

In both studies, VTTI researchers instrumented commercial vehicles with systems that were far more capable than EDRs and included video data. Due to behavior of the drivers, and the number of critical incidents, near-crashes, and crashes recorded, VTTI researchers were of the opinion that the commercial drivers drove as they normally would. The data collected in the studies were confidential. If EDRs collected data that were regularly reviewed by an employer and could be used as grounds for dismissal, drivers may drive more cautiously. Eaton-Vorad has discovered such affects associated with the deployment of their forward collision warning system as reported on their website.

(7) **<u>Possible new databases</u>. As more and more vehicles are equipped with EDRs, more EDR crash data will be generated. Collection of these data is likely to increase as state and local officials collect these data as part of their investigations. Do you have any recommendations for storing and maintaining a national or other databases? Do you believe maintaining a database would be beneficial to motor vehicle safety? Please provide specific examples.**

Such a question should be answered by a committee of all involved stakeholders; however, several database "sites", perhaps at Universities, would be a logical solution.

(8) **<u>Standards</u>. What standards exist for collecting EDR data? The Society of Automotive Engineers (SAE) has a recommended practice (SAE J211) that provides guidance for collecting crash test data. Would it be possible to use this or similar standards for collecting EDR data regarding real-world crashes? The Institute of Electrical and Electronics Engineers, Inc. (IEEE) has recently initiated a new program to develop a standard for motor vehicle EDRs. We request comments on the current activities of SAE, IEEE, and other standards organizations (U.S. and international) in developing standards for EDRs, and on what types of standards should be developed.**

Standards for collecting data must be set for all vehicle types in order to maximize the utility of the data.

(9) **<u>Standardization</u>. We request comments on whether there would be any safety benefits from standardizing certain aspects of EDRs, e.g., defining specific data elements such as vehicle speed, brake application, air bag deployment time, etc. Would such standardization promote further development and implementation of automatic crash notification systems or other safety devices?**

The data elements for EDRs should be standardized for maximum value of the data, to encourage ease of use, and to discourage misuse of the data.